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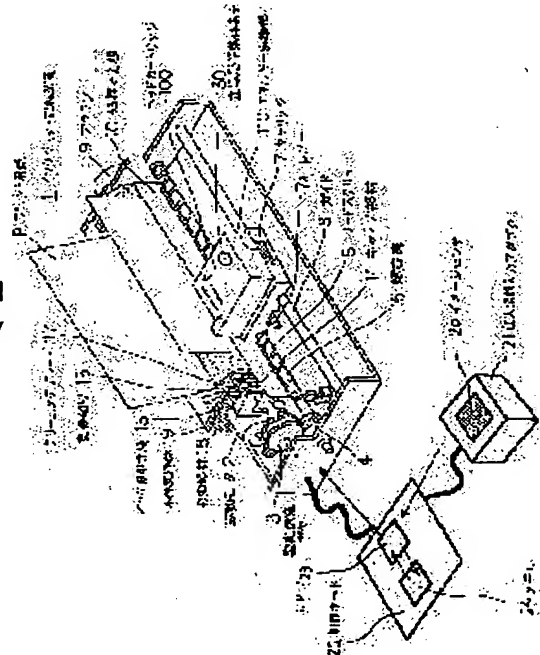
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(54) MEMORY DEVICE, THREE-DIMENSIONAL SEMICONDUCTOR DEVICE, RECORDING HEAD CARTRIDGE PROVIDED WITH THE DEVICE, RECORDING APPARATUS, AND SECURITY SYSTEM OF THE RECORDING APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a recording apparatus which cannot be recorded except by an owner or those permitted with registration.

SOLUTION: A three-dimensional semiconductor device 30 is buried in a wall part of the top surface of a head cartridge 100 mounted on an ink jet recording apparatus 1, the three-dimensional semiconductor device 30 comprising a recognition part of personal information and an energy conversion part for converting external energy supplied from an energy supply part 110 without contact to electric power for starting the recognition part.



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CLAIMS

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[Claim(s)]

[Claim 1] The memory device which is a memory device which has an energy conversion means to transform into power the external energy supplied by non-contact from the exterior, and is characterized by starting with said power and holding individual humanity news.

[Claim 2] The memory device according to claim 1 which consists of a non-volatile semi-conductor.

[Claim 3] The memory device according to claim 1 or 2 which has the recognition section which recognizes individual humanity news.

[Claim 4] The solid form semiconductor device characterized by having the recognition section which is the solid form semiconductor device which has an energy conversion means to transform into power the external energy supplied by non-contact from the exterior, and recognizes individual humanity news, starting with said power, and holding said recognized individual humanity news.

[Claim 5] The solid form semiconductor device according to claim 4 further equipped with a means to encipher said recognized individual humanity news.

[Claim 6] The solid form semiconductor device according to claim 5 by which a means to hold said recognized individual humanity news is established in the solid form semiconductor device.

[Claim 7] The solid form semiconductor device according to claim 6 to which data will disappear if the interior is opened.

[Claim 8] The solid form semiconductor device according to claim 7 by which the cavernous section was formed into the solid form semiconductor device, the circuit was formed in the part which faces this cavernous section with the oxidation ingredient which carries out oxidation disappearance, and inert gas was enclosed with said cavernous section.

[Claim 9] The data which a means to encipher said recognized individual humanity news had enciphered recognition data using a part of key code, and said a part of key code was given from the external device, and were enciphered are a solid form semiconductor device according to claim 5 or 6 which is what can be decoded only in the remaining part of said key code.

[Claim 10] Said individual humanity news is a solid form semiconductor device given in any 1 term of claims 4-9 which are the iris of voice, a fingerprint, or an eyeball.

[Claim 11] A means to hold said recognized individual humanity news is a solid form semiconductor device according to claim 10 which is the image memory holding a pattern image.

[Claim 12] A memory device is a solid form semiconductor device according to claim 11 which consists of a non-volatile semiconductor.

[Claim 13] The iris of an eyeball is a solid form semiconductor device according to claim 10 characterized by acquiring with image sensors.

[Claim 14] The external energy which said energy conversion means transforms into power is a solid form semiconductor device given in any 1 term of claims 4-13 which are the electromotive force by electromagnetic induction, heat, light, or the radiation.

[Claim 15] Said energy conversion means is a solid form semiconductor device given in any 1 term of claims 4-13 which consists of an oscillator circuit equipped with the conductor coil changed into power by the electromagnetic induction from an external resonance circuit.

[Claim 16] Said conductor coil is a solid form semiconductor device according to claim 15 currently formed so that it may coil around the outside surface of a solid form semiconductor device.

[Claim 17] The record head cartlidge by which the solid form semiconductor device of a publication was prepared in any 1 term of claims 4-16.

[Claim 18] The record head cartlidge [ equipped with the recording head section which carries out the regurgitation of the record drop, and the tank section which holds the recording ink which supplies this recording head ] according to claim 17.

[Claim 19] The recording device which carries a record head cartlidge in claim 17 or 18, enabling free attachment and detachment, and records by breathing out a record drop from the recording head section to a record medium.

[Claim 20] It is the security system of a recording apparatus which carries a record head cartlidge removable. Said record head cartlidge The recognition data-hold section which holds the individual humanity news recognized in the recognition section which recognizes individual humanity news as recognition data, The key code A attaching part

holding the key code A, and the encryption transducer which enciphers said recognition data in said key code A, The encryption data-hold section holding the encryption data based on this encryption transducer, The information I/O section which receives said key code A from said recording apparatus side, and transmits said recognition data and said encryption data to said recording apparatus, It has the solid form semiconductor device which has the energy conversion section which changes the electromotive force supplied by non-contact into the power which starts each configuration section from said recording device side. Said recording device The energy feed zone which supplies electromotive force to said energy conversion section by non-contact, The key code K setting section for the owner of a recording device to set up the key code K, The key code A attaching part and key code B attaching part holding each of the key code A generated from said key code K, and the key code B, The information I/O section which transmits said key code A to said solid form semiconductor device, and receives said recognition data and said encryption data from said solid form semiconductor device side, The recognition data-hold section holding said recognition data, and the encryption data-hold section holding said encryption data, The decryption transducer which decrypts said encryption data in said key code B, and the decryption data-hold section holding the decryption data based on said decryption transducer, The security system of the recording device characterized by having the data comparator which carries out comparison collating of said recognition data and said decryption data, and the judgment processing section which permits use of a recording device or is made impossible according to the comparison result by said data comparator.

[Claim 21] The encryption data enciphered in key code A are the security system of the recording apparatus according to claim 20 which is what cannot decrypt in said key code A, but can be decoded only in said key code B.

[Claim 22] Said individual humanity news is the security system of the recording apparatus according to claim 20 which is the iris of voice, a fingerprint, or an eyeball.

[Claim 23] The security system of the recording apparatus according to claim 20 with which said recognition data-hold section, said key code A attaching part, said encryption transducer, and said encryption data-hold section are arranged into said solid form semiconductor device, and said information I/O section and said energy transducer are formed a front face or near a front face said solid form semiconductor device.

[Claim 24] The electromotive force which said energy feed zone supplies and said energy conversion section changes into power is the security system of a recording apparatus given in any 1 term of claims 20-23 which are electromagnetic induction, heat, light, or a radiation.

[Claim 25] Said energy feed zone and said energy transducer are the security system of the recording apparatus according to claim 24 currently installed so that it may face, when said record head cartlidge is carried.

[Claim 26] It is the security system of the recording apparatus according to claim 25 which said energy feed zone consists of a resonance circuit equipped with the conductor coil, said energy conversion section consists of an oscillator circuit equipped with the conductor coil contiguous to the conductor coil of said resonance circuit, and the conductor coil of said oscillator circuit changes into power by the electromagnetic induction from said resonance circuit.

[Claim 27] The conductor coil of said oscillator circuit is the security system of the recording apparatus according to claim 26 currently formed so that it may coil around the outside surface of said solid form semiconductor device.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to recording devices, such as a facsimile printer, a copying machine, etc. which has a security function.

[0002]

[Description of the Prior Art] Various kinds of printer systems are used for current and various kinds of image printings. Such a printer system consists of structure which connected a data processor and printer equipments, such as a personal computer, and carries out the printout of the print data in which a data processor generates and carries out an external output to record media, such as a print sheet, with printer equipment.

[0003] Although the equipment by the various record approaches has appear on the market in a commercial scene as printer equipment use for such a printing system, it is the non impact record approach which does not almost have generating of the noise at the time of record also in various kinds of record methods, and high-speed record is possible, and the so-called ink jet record method ( the ink jet record method ) for the ability to be able to perform record, without moreover need fixing processing special to a regular paper is the very useful record approach.

[0004]

[Problem(s) to be Solved by the Invention] Development of such an ink jet record technique is remarkable, and it is possible that the print quality is becoming recent years very high, and is applied also to creation of a security, an official document, etc. Therefore, in the printer system used for creation of such a document, having the SEKIRI tea function prevent from using is called for except those who were permitted by the owner of an ink jet printer, or registration.

[0005] Moreover, there is copyright in the document and image which he created by

computer only for individuals, the 3rd person is not allowed to perform the printout without notice, but a SEKIRYU tea function is needed like [ in such a case ] the above.

[0006] In developing the above printer systems, this invention persons paid their attention to the ball semiconductor of ball Semiconductor of forming a semiconductor integrated circuit on the spherical surface with a diameter of 1mm of a silicon ball. It was expected that it could raise SEKIRI tea nature since it is hard to analyze it compared with the thing of a plan type if the data which recognize those who did licence are made to hold in a ball, since this ball semiconductor is a globular form. However, when the thing with the function for registration or user discernment was investigated, development of the component itself which realizes the above-mentioned function is needed only by the technique which connects ball semiconductors by electric wiring like USP No. 5877943 existing. Moreover, in order for this component to be a thing applicable effective in a printer system, the technical problem which must be cleared also occurred.

[0007] It is supply of the power for starting a component. If the power source for starting of a component is connected with the component with wiring etc., the installation of a component will be restrained, and depending on a location, the registration and user discernment from the outside will become difficult (for example, when based on voice or a fingerprint). For example, in an ink jet printer, the tank which holds the recording ink supplied to the recording head which records, and this head is attached, and there is a thing of an exchangeable cartridge type to the body of equipment, and when applying a component to this type, arrangement of a component will be limited to the substrate for recording heads. Therefore, the component needed to be started by non-contact from the exterior.

[0008] The purpose of this invention gives the security function which enables the registration and user discernment from the outside to a solid mold semiconductor device, and offers the memory device used for the security system of a recording apparatus and this which prevent from recording, a solid form semiconductor device, and a record head cartlidge except those who were permitted by the owner or registration while it enables it to start a solid mold semiconductor device by non-contact from the exterior.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the memory device of this invention is a memory device which has an energy conversion means to transform into power the external energy supplied by non-contact from the exterior, and is characterized by starting with said power and holding individual humanity news.



[0010] It is desirable to have the recognition section which this memory device consists of a non-volatile semi-conductor, and recognizes individual humanity news.

[0011] Moreover, the solid form semiconductor device of this invention is a component which has an energy conversion means to transform into power the external energy supplied by non-contact from the exterior, and is characterized by having the recognition section which recognizes individual humanity news, starting with said power, and holding said recognized individual humanity news.

[0012] As for the above-mentioned solid form semiconductor device, it is desirable to have further a means to encipher said recognized individual humanity news.

[0013] Furthermore, it is desirable to establish a means to hold said recognized individual humanity news, into a solid form semiconductor device. In this case, when the interior is opened, that to which data disappear is desirable, the cavernous section is specifically formed into a solid form semiconductor device, a circuit is formed in the part which faces this cavernous section with the oxidation ingredient which carries out oxidation disappearance, and that by which inert gas was enclosed with said cavernous section can be considered.

[0014] A means to encipher said recognized individual humanity news has enciphered recognition data using a part of key code, said a part of key code is given from an external device, and the enciphered data can be decoded only in the remaining part of said key code.

[0015] It is possible that said individual humanity news is the iris of voice, a fingerprint, or an eyeball. In this case, it is possible that the maintenance means of said individual humanity news is the image memory holding a pattern image, and, as for a memory device, consisting of a non-volatile semi-conductor is desirable. The iris of an eyeball can be acquired with image sensors especially.

[0016] It is possible that the external energy which said energy conversion means transforms into power is the electromotive force by electromagnetic induction, heat, light, or the radiation.

[0017] Said energy conversion means can consider consisting of an oscillator circuit equipped with the conductor coil changed into power by the electromagnetic induction from an external resonance circuit.

[0018] In this case, said conductor coil is formed so that it may coil around the outside surface of a solid form semiconductor device.

[0019] in the above memory devices and solid form semiconductor devices, an energy conversion means transform into power the external energy supplied by non-contact from the exterior, a component be start, since it become possible to hold the individual

humanity news recognize in the recognition section , it be necessary to perform a component and electrical connection for an electric power supply , and the component which carried out record maintenance of the individual humanity news can be arrange freely .

[0020] For example, by forming so that the conductor coil of an oscillator circuit may be twisted around the outside surface of a solid form semiconductor device as an energy conversion means, a conductor coil is made to generate power by electromagnetic induction between external resonance circuits, and power can be supplied to a component by non-contact.

[0021] Furthermore, by having established a means to hold the data recognized as individual humanity news, into a solid form semiconductor device, it becomes difficult to acquire individual humanity news in the analysis from the outside, and security nature increases.

[0022] In addition, since it is possible to recognize individual humanity news in three dimension, compared with the case where the semiconductor device of a monotonous form is used, there are also few limits of the direction of information recognition.

[0023] Moreover, this invention is characterized also by the record head cartlidge in which the above solid form semiconductor devices were prepared. What was equipped with the recording head section which carries out the regurgitation of the record drop, and the tank section which holds the recording ink which supplies this recording head as this record head cartlidge is applicable.

[0024] Furthermore, this invention is carried for the above record head cartlidges, enabling free attachment and detachment, and is characterized also by the recording device which records by breathing out a record drop from the recording head section to a record medium.

[0025] This invention is a security system of a recording apparatus which carries a record head cartlidge removable. Moreover, said record head cartlidge The recognition data-hold section which holds the individual humanity news recognized in the recognition section which recognizes individual humanity news as recognition data, The key code A attaching part holding the key code A, and the encryption transducer which enciphers said recognition data in said key code A, The encryption data-hold section holding the encryption data based on this encryption transducer, The information I/O section which receives said key code A from said recording apparatus side, and transmits said recognition data and said encryption data to said recording apparatus, It has the solid form semiconductor device which has the energy conversion section which changes the electromotive force supplied by non-contact into the power which starts

each configuration section from said recording device side. Said recording device The energy feed zone which supplies electromotive force to said energy conversion section by non-contact, The key code K setting section for the owner of a recording device to set up the key code K, The key code A attaching part and key code B attaching part holding each of the key code A generated from said key code K, and the key code B, The information I/O section which transmits said key code A to said solid form semiconductor device, and receives said recognition data and said encryption data from said solid form semiconductor device side, The recognition data-hold section holding said recognition data, and the encryption data-hold section holding said encryption data, The decryption transducer which decrypts said encryption data in said key code B, and the decryption data-hold section holding the decryption data based on said decryption transducer, It is characterized by having the data comparator which carries out comparison collating of said recognition data and said decryption data, and the judgment processing section which permits use of a recording device or is made impossible according to the comparison result by said data comparator.

[0026] At the above security systems, by the recording device side, if the key code K is beforehand set as the key code K setting section by the owner of equipment and a user permits registration, the key code A and the key code B will be generated from the key code K, a key code A attaching part and a key code B attaching part will be held in each, and it will be transmitted to a solid form semiconductor device through the information I/O section of a recording device about the key code A. And if the recognition section recognizes a registrant's individual humanity news at the time of registration, this information will be held as recognition data at the recognition data-hold section of the solid form semiconductor device which a record head cartlidge has. And recognition data are enciphered by the encryption transducer using said key code A, and this enciphered data is held in the encryption data-hold section.

[0027] On the other hand, if a user asks a recording device for licence, individual humanity news will be recognized in the recognition section, and it will be held as recognition data at the recognition data-hold section of the solid form semiconductor device which a record head cartlidge has. And the encryption data generated with this recognition data at the time of registration are transmitted to a recording device from the information I/O section. In a recording apparatus, it is received in the information I/O section and a user's recognition data and encryption data which have been transmitted are held at the recognition data-hold section and the encryption data-hold section, respectively. And encryption data are decrypted by decryption data using the key code B by the decryption transducer, and are held at the decryption data-hold

section. Then, decryption data are a data comparator and comparison collating is carried out with a user's recognition data. If coincidence is checked by comparison collating, the judgment processing section will presume that a user is a registrant, and will permit use of a recording device. Since it is a non-registrant when data are an inequality, the judgment processing section prevents from using a recording device.

[0028] In this case, in said key code A, the encryption data enciphered in key code A cannot be decrypted, but can be decoded only in said key code B. It is possible that said individual humanity news is the iris of voice, a fingerprint, or an eyeball.

[0029] According to the above security systems, the recognition data of those whom the owner of a recording apparatus permits and by whom he was registered are enciphered using the key code A which is a part of key code K which the owner decided. Since storage maintenance of this encryption data is carried out at the solid form semiconductor device of a record head cartlidge as what can be decrypted only in key code B which is the remaining part of said key code and storage maintenance of the key code B is carried out into the recording device, Even if it analyzes only a component, a registrant's recognition code is unacquirable. Moreover, if the encryption data-hold section is formed into the component using the solid configuration of a component, compared with the case where it forms on a flat-surface base, the data analysis from the outside will become very difficult, and its security nature will improve. In addition, although it is indicated by the smart card of JP,9-259197,A that the IC card was used for the customer card and two personal identification numbers are memorized, memorizing the individual humanity news itself and a personal identification number on the card itself has high possibility of decoding even if even if it is two or more personal identification numbers. On the other hand, the security system of this invention becomes what has whenever [ security / very high ] by giving the key which can encipher individual humanity news and can be decrypted to a body side.

[0030] Furthermore, it is desirable that said recognition data-hold section, said key code A attaching part, said encryption transducer, and said encryption data-hold section are arranged into said solid form semiconductor device, and said information I/O section and said energy conversion section are formed a front face or near a front face said solid form semiconductor device.

[0031] As electromotive force which said energy feed zone supplies and said energy conversion section changes into power, electromagnetic induction, heat, light, or a radiation is applicable.

[0032] As for said energy feed zone and said energy transducer, it is desirable to be installed so that it may face, when said record head cartlidge is carried.

[0033] In this case, said energy feed zone consists of a resonance circuit equipped with the conductor coil, said energy conversion section consists of an oscillator circuit equipped with the conductor coil contiguous to the conductor coil of said resonance circuit, and the conductor coil of said oscillator circuit changes it into power by the electromagnetic induction from said resonance circuit. Furthermore, as for the conductor coil of said oscillator circuit, it is desirable to form so that it may coil around the outside surface of said solid form semiconductor device.

[0034] In addition, all various solid forms, such as the triangle pole, a ball, a hemisphere, the square pole, a spheroid, and 1 shaft body of revolution, are included with the "solid form" of the "solid form semiconductor device" in this specification.

[0035]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Especially the case where the solid mold semiconductor device which has an add function and a user discernment function in this head cartlidge has been arranged in the printer which carries the head cartlidge which attached the recording head and the ink tank exchangeable is explained to a detail. In addition, this component is not applied only to a head cartlidge, and the same effectiveness is acquired even if it allots and uses for other locations (for example, body panel of equipment).

[0036] Drawing 1 is the outline perspective view showing the ink jet recording device by the gestalt of operation of this invention.

[0037] The head cartlidge 100 carried in the ink jet recording apparatus 1 shown in drawing 1 has the liquid discharge head which carries out the regurgitation of the ink droplet for printing record, and an ink tank holding the liquid supplied to the liquid discharge head. moreover, the solid form semiconductor device 30 should embed at the wall of the top face of a head cartlidge 100 -- the security system of this equipment consists of a solid form semiconductor device 30 and a recording apparatus 1 so that it may \*\* and mention later. In addition, in the recording apparatus 1, the energy feed zone 110 which supplies the electromotive force which is external energy by non-contact to the solid form semiconductor device 30 attached in the upper part of the head cartlidge 100 carried in carriage 7 is installed. The electromotive force supplied in order to operate a component can apply electromagnetic induction, heat, light, a radiation, etc.

[0038] The head cartlidge 100 is carried on the carriage 7 engaged to the spiral slot 6 of a leading screw 5 which is interlocked with the forward inverse rotation of a drive motor 2, and is rotated through the driving force transfer gears 3 and 4, as shown in drawing 1. Along with a guide 8 in carriage 7, both-way migration of the head cartlidge 100 is

carried out in the direction of arrow heads a and b by the power of a drive motor 2. The ink jet recording apparatus 1 is equipped with a recorded-media conveyance means (un-illustrating) to convey the print form P as recorded media which receive liquids, such as ink breathed out from the head cartlidge 100. The paper presser-foot plate 10 of the print form P which has a platen 9 top conveyed presses the print form P to a platen 9 covering the migration direction of carriage 7 with the recorded-media conveyance means.

[0039] Near the end of a platen 9, it has the supporter material 13 which supports the wrap cap member 14 in the front face with the delivery of a head cartlidge 100. Moreover, it has an ink suction means 15 to attract the ink with which air ejecting etc. was carried out from the head cartlidge 100, and the interior of the cap member 14 was covered. Suction recovery of a head cartlidge 100 is performed by this ink suction means 15 through opening of the cap member 14.

[0040] The migration member 18 is supported by the body base material 19 of the ink jet recording apparatus 1 movable in the right-angled direction to the cross direction, i.e., the migration direction of carriage 7. The cleaning blade 17 is attached in the migration member 18. A cleaning blade 17 may be a well-known cleaning blade of not only this gestalt but other gestalten.

[0041] In the ink jet recording device 1 which has the configuration mentioned above, a head cartlidge 100 carries out both-way migration covering full [ of the print form P ] to the print form P which has a platen 9 top conveyed by the aforementioned recorded-media conveyance means. If a driving signal is supplied to a head cartlidge 100 from a driving signal supply means by which it does not illustrate at the time of this migration, according to this signal, ink (record liquid) will be breathed out from the liquid discharge-head section to recorded media, and record will be performed.

[0042] Next, the security system of the above-mentioned ink jet recording apparatus is explained. Drawing 2 and drawing 3 show the configuration of the security system of the recording apparatus of this example, and are describing the data transfer between the data transfer between the especially configuration sections at time of registration from drawing 2 configuration-sections at the time of user discernment from drawing 3 by the arrow head.

[0043] The solid form semiconductor device 30 which is attached to the head cartlidge 100 of this example as shown in these drawings The 1st recognition data-hold section 103 which holds the individual humanity news recognized in the recognition section 102 which recognizes individual humanity news on the occasion of the time of registration and user discernment as recognition data, The 1st information I/O section 107 which

receives the key code A from a recording apparatus 1 side, and transmits encryption data and recognition data to a recording apparatus 1, The 1st key code A attaching part 105 holding the key code A which the information I/O section 107 received, The encryption transducer 104 which enciphers recognition data in key code A, and the 1st encryption data-hold section 106 holding the encryption data based on the encryption transducer 104, It has the energy conversion section 108 which changes the electromotive force supplied by non-contact toward the component 30 into the power which starts the above-mentioned configuration sections 102-107 at least from a recording device 1 side.

[0044] Moreover, at least, the energy conversion section 108 and the information I/O section 107 are formed a front face or near a front face the component 30, and being formed into a component 30 is desirable [ the other configuration section ] in order to raise security nature.

[0045] On the other hand, the control unit in the recording device 1 which carries a head cartridge 100 (un-illustrating) The energy feed zone 110 which supplies the electromotive force which is external energy by non-contact to the solid form semiconductor device 30, The key code K setting section 111 for an owner to set up the key code K and the 2nd key code A attaching part 112 holding the key code A generated from the key code K because a user permits registration, The key code B attaching part 113 holding the key code B generated from the key code K by the registration authorization by the user, The 2nd information I/O section 109 which transmits the key code A to the solid form semiconductor device 30, and receives recognition data and encryption data from a component 30 side, The 2nd recognition data-hold section 115 holding recognition data, and the 2nd encryption data-hold section 114 holding encryption data, The decryption transducer 117 which decrypts encryption data in key code B, and the decryption data-hold section 118 holding the decryption data based on the decryption transducer 117, It has the data comparator 116 which carries out comparison collating of recognition data and the decryption data, and the judgment processing section 119 which permits equipment use or is made into disapproval according to the comparison result by the data comparator 116. However, in key code A, the encryption data enciphered in key code A shall not be decrypted, but shall decode only the key code B.

[0046] Even if an electric power supply is cut off, as for the attaching part of the individual humanity news data within a component 30 and the body of a recording apparatus, or a key code, it is desirable that it is nonvolatile memory as data are held.

[0047] As for the energy feed zone 110, it is desirable to be installed so that it may

correspond to the solid form semiconductor device 30 which the head cartlidge 100 with which carriage 7 was equipped has on carriage 7.

[0048] In order that the information I/O section 107,109 of a head cartlidge 100 and a recording device 1 may exchange information, a non-contact thing is sufficient also as a contact process, and in the case of a contact process, when carriage 7 is equipped with a cartridge 100, what can aim at an electric flow mutually can be applied. In the case of a non-contact type, the means of communications which used light, the electric wave, the field, etc. is applicable.

[0049] Moreover, the recognition section 102 recognizes the iris of a fingerprint, voice, or an eyeball etc. as individual humanity news, the recognition section 102 is formed on the solid form semiconductor device 30, and also not only the example of a configuration shown in drawing 2 and drawing 3 but the solid form semiconductor device 30 may have the recognition section 102 in the component exterior.

[0050] For example, it is possible to form the individual humanity news input adapter 21 which has the image sensors 20 as the recognition section on the body of a recording apparatus, as shown in drawing 1, and to recognize patterns, such as the iris of an eyeball, by this. This recognized individual humanity news is sent to the control board 22 of the body of a recording apparatus. After the individual humanity news with which CPU23 and memory 24 are carried and the control board 22 has been recognized to be is held temporarily and data processing is carried out to memory 24 by CPU23, it is transmitted to the solid form semiconductor device 30 through the information I/O section (un-illustrating). And storage maintenance of the data of individual humanity news is carried out within the solid form semiconductor device 30. In this case, what is necessary is just to obtain the starting power of image sensors 20 from the body side of equipment.

[0051] Recognition and the acquisition means of the iris of an eyeball may use the same thing as the iris recognition system of a publication for JP,9-201348,A etc.

[0052] Next, the case where those whom the owner of a recording device 1 permits are registered with reference to drawing 2 and drawing 4 is explained. In addition, drawing 4 shows the flow of operation at the time of registration.

[0053] The key code K which the owner decided is set to the key code K setting section 111 of a recording device 1 (step S1). And if an owner permits registration, from the key code K, the key code A and the key code B will be generated (steps S2 and S3), and it will be held at the key code A attaching part 112 of a recording device 1, and the key code B attaching part 113, respectively. The key code A is transmitted to the solid form semiconductor device 30 of a head cartlidge 100 from the information I/O section 109 of



a recording apparatus 1.

[0054] On the other hand, in a head cartlidge 100, the key code A transmitted to the solid form semiconductor device 30 is received in the information I/O section 107 of the solid form semiconductor device 30, and it is held at the key code A attaching part 105 (step S4). Moreover, 101, such as a registrant's voice or a fingerprint, is recognized in the recognition section 102 of the solid form semiconductor device 30 (step S5). Then, 101, such as voice or a fingerprint, is held as recognition data at the recognition data-hold section 103 (step S6). And recognition data are enciphered by encryption data using the key code A by the encryption transducer 104 (step S7). This encryption data is held by the encryption data-hold section 106 (step S8), and the registration of a person which the owner permitted ends it.

[0055] Next, with reference to drawing 3 and drawing 5, the case where the user of a recording device 1 identifies whether you are a registrant is explained. In addition, drawing 5 shows the flow of operation at the time of discernment.

[0056] First, if a user asks a recording apparatus for licence, 121, such as a user's voice or a fingerprint, will be recognized in the recognition section 102 of the solid form semiconductor device 30 attached to a head cartlidge 100 (step S9, S10). Then, 121, such as voice or a fingerprint, is held as recognition data at the recognition data-hold section 103 (step S11). And the encryption data generated with this recognition data at the time of registration are transmitted to a recording device 1 from the information I/O section 109.

[0057] In a recording apparatus 1, it is received in the information I/O section 109, and a user's recognition data and encryption data which have been transmitted are held at the recognition data-hold section 115 and the encryption data-hold section 114, respectively (step S11). And encryption data are decrypted by decryption data using the key code B by the decryption transducer 117, and are held at the decryption data-hold section 118 (step S12). Then, decryption data are the data comparator 116 and comparison collating is carried out with a user's recognition data (step S13). If coincidence is checked by comparison collating, the judgment processing section 119 will presume that a user is a registrant, and will make a recording device 1 usable (step S14). Since it is a non-registrant when data are an inequality, the judgment processing section 119 prevents from using a recording device 1 (step S15).

[0058] Although the energy feed zone 110 which supplies electromotive force to a component 30 as external energy was formed in carriage 7 with the gestalt explained above, you may prepare in a recovery position, a return position, etc.

[0059] According to this gestalt, the recognition data of those whom the owner of a

recording apparatus 1 permits and by whom he was registered are enciphered using a part of key code which the owner decided. Since storage maintenance of this encryption data is carried out as what can be decrypted only in the remaining part of said key code at the solid form semiconductor device 30 of a head cartlidge 100 and storage maintenance of the remaining part of said key code is carried out into the recording device 1, Even if it analyzes only a component, a registrant's recognition code is unacquirable. Moreover, if the encryption data-hold section is formed into the component using the solid configuration of a component 30, compared with the case where it forms on a flat-surface base, the data analysis from the outside will become very difficult, and its security nature will improve.

[0060] Since the component 30 furthermore has the energy conversion section 110 according to this gestalt, a component 30 can be freely installed in the location which it becomes unnecessary to perform direct electric wiring with the exterior, and is easy to read individual humanity news, such as voice of a user or a registrant, and a fingerprint, at a head cartlidge 100 or a recording device 1.

[0061] Moreover, although the example which uses the solid form semiconductor device of this invention for an ink jet recording device was given with this gestalt, since this solid form semiconductor device can carry out storage maintenance of the data of individual humanity news, it is also possible for the recognition which is him by embedding the solid form semiconductor device 151 on the body 150 to become certain as shown in drawing 14 , and to deduce a charlatan certainly.

[0062] Moreover, accident and a therapy suitable when sick are able to be able to undergo by carrying out memory of his clinical-recording profile.

[0063]

[Example] Hereafter, the desirable example which may be applied to the above-mentioned security system is explained in detail.

[0064] First, the example of a configuration of the recognition section 102 which recognizes a registrant or a user is given.

[0065] Drawing 6 and drawing 7 are the rough sectional views and top views of a voice input sensor at the time of using a voice input sensor as the recognition section 102.

[0066] As shown in drawing 6 and drawing 7 , using the diaphragm 202 of the silicon base, a voice input sensor makes a piezoresistance (silicon strain gauge) 200 by the diffusion method to the part, integrates the electrical circuit which constitutes an operation amplifier (for example, PNP transistor 201) around the sensor, and is formed near the front face of the solid form semiconductor device 30. As a circuit function, it has functions, such as amplification degree adjustment of an output, compensation of the

temperature characteristic (a zero point, sensibility), and adjustment of a zero point, and in order to take those adjustments, the function which carries out laser trimming of the non-illustrated thin film resistor separately may be added.

[0067] Here, in case human being utters the adopted silicon strain gauge, it is used for the purpose which detects bone vibration to which \*\*\*\* vibrates. The usual speech recognition recognizes, after standardizing the input, the conversion to a frequency domain, the audio die length, and the audio tune which were detected with the microphone. However, by this voice input sensor, the high piezoresistance condenser of silicon can be used and pressure wave vibration can be detected to high sensitivity (the gauge factor of silicon is usually about about 200). Distortion by the pressure oscillatory wave detected from this voice input sensor is changed into an electrical signal, and the recognition data-hold section 103 holds the formed voice input signal as a registrant's recognition data.

[0068] Moreover, the rough sectional view of the fingerprint sensor at the time of using a fingerprint sensor for drawing 8 as the recognition section 102 is shown.

[0069] As shown in drawing 8, change produces the fingerprint sensor 203 in the resistance of a resistive layer 205 by whether using the thin film diaphragm 204 of the silicon base, the resistive layer 205 with several detailed micron angle (heater) is made by the diffusion method etc. at the part, and the front face of a finger 206 contacts the detailed resistive layer 205, or it does not carry out. It will be used for the fingerprint discernment judging which is individual humanity news if the change is measured in the whole surface product which the fingerprint part of a finger contacts. And if the electrical circuit which constitutes an operation amplifier is accumulated around the sensor, the precision to judge will improve further. As a circuit function, it has functions, such as amplification degree adjustment of an output, compensation of the temperature characteristic, and adjustment of a zero point.

[0070] Furthermore, drawing 9 is the block diagram of the fingerprint sensor which combined the shift register which arranges said fingerprint sensor to two-dimensional, and controls a horizontal scanning and a vertical scanning. for example, -- if each fingerprint sensor is formed with the MOSFET mold in this block diagram -- turning on and off of the drain electrical potential difference of MOS -- or the two-dimensional information on a fingerprint is detectable by turning on and off all the gates of MOSFET required for one vertical horizontal scanning to coincidence.

[0071] Next, in the above-mentioned security system, the example which prevents from using a recording device 1 is given as a result of a user discernment judging. Drawing 10 is the schematic diagram showing the configuration of a head cartlidge of which

record can be made impossible. After the ink tank 301 of a head cartlidge shown in this drawing holds ink 302 in the interior from a bulb 303, attracts the air in the ink tank 301 through a bulb 303 with a suction pump 304 and sets the inside of a tank as predetermined negative pressure, it closes a bulb 303. If the ink 302 of such an ink tank 301 is consumed by discharging of an ink jet recording head, since the inside of a tank will not be open for free passage with atmospheric air, the negative pressure in a tank becomes large to a negative direction. When the negative pressure in a tank exceeds a predetermined value, the meniscus of the regurgitation nozzle of an ink jet recording head retreats too much, and it stops being able to carry out the regurgitation of the recording ink. So, if the pressure sensor (un-illustrating) which detects negative pressure in a tank is arranged and the value of a pressure sensor exceeds a predetermined value, a bulb 303 will be opened until a pressure sensor reaches below a predetermined value again, and the negative pressure in a tank will be uniformly controlled by this ink supply configuration.

[0072] Therefore, when using the record head cartlidge of drawing 10 for a recording apparatus 1 and judging with a data inequality as a result of the user discernment judging in the above-mentioned security system, a bulb 303 is opened and it prevents from recording by lowering the pressure of the negative pressure in a tank with a suction pump 304 to the level impossible [ the ink regurgitation ] as a result which cannot be ink supplied to a head.

[0073] Next, the example of the energy conversion section 108 applicable to the solid form semiconductor device 30 is given. Drawing 11 is drawing for explaining the power generating principle of the energy conversion section 108.

[0074] In drawing 11 , if the coil La of the external resonance circuit 31 is adjoined, the conductor coil L of an oscillator circuit 32 is placed and Current Ia is passed in Coil La through the external resonance circuit 31, the magnetic flux B which pierces through the coil L of an oscillator circuit 32 according to Current Ia will arise. Here, since the magnetic flux B which pierces through Coil L will change if Current Ia is changed, induced electromotive force  $\bar{V}$  arises in Coil L. Therefore, the oscillator circuit 32 as the energy conversion section is made for a component 30, and the power which operates a component can be generated in the induced electromotive force by the electromagnetic induction from the outside by arranging the external resonance circuit 31 in the body side of a recording device as an energy feed zone, so that the conductor coil L of the oscillator circuit 32 of a component 30 and the coil La of the resonance circuit 32 of the body of equipment may adjoin.

[0075] Therefore, in the printer system shown in drawing 1 thru/or drawing 3 , when

the energy feed zone 110 of carriage 7 is constituted from an external resonance circuit 31 and the energy transducer 108 of the solid form semiconductor device 30 attached to a head cartlidge 100 is constituted from an oscillator circuit 32, it is in the condition that carriage 7 was equipped with the head cartlidge 100, and it designs so that the conductor coil L of the oscillator circuit 32 by the side of a component and the coil La of the external resonance circuit 31 by the side of carriage may adjoin.

[0076] Moreover, when light may be used and it changes the light and darkness of this light into an electrical signal besides generating power in electromagnetic induction with a coil as mentioned above, power can be generated according to the photoconductive effect using the ingredient (for example, photoconductor) from which resistance changes with the exposures of light. As photoconductor, a binary alloy/ternary alloys, such as CdS, InSb, and  $\text{Hg}_{0.8}\text{Cd}_{0.2}\text{Te}$ , GaAs, Si, Va-Si, etc. are used. Furthermore, when using heat as electromotive force, power can be generated according to the quantum effectiveness from the radiant energy of the matter.

[0077] Next, the manufacture approach of the solid form semiconductor device of this example is explained. Drawing 12 is process drawing for explaining an example of the manufacture approach of the solid form semiconductor device used for this invention, and shows each process in the cross section passing through the core of spherical silicon.

[0078] In order to form opening 213 in some  $\text{SiO}_2$  film as shown in drawing 12 (c) after forming  $\text{SiO}_2$  film 212 of thermal oxidation on [ all ] a front face to the spherical silicon 211 shown in drawing 12 (a), as shown in drawing 12 (b), patterning is carried out using a photolithography process.

[0079] And as shown in drawing 12 (d), by the anisotropic etching using the KOH solution which leads opening 213, only a upside silicon part removes and the cavernous section 214 is formed. Then, the configuration section for the security system shown by drawing 2 and drawing 3 is formed in the silicon part which faces the cavernous section 214. and it is shown in drawing 12 (e) -- as -- LPCVD -- the SiN film 215 is formed in the inside and outside front face of a solid form component using law.

[0080] Furthermore, as shown in drawing 12 (f), the Cu film 216 is formed on all the front faces of a solid form component using a metal CVD method. And as shown in drawing 12 (g), patterning of the Cu film 216 is carried out using a well-known photolithography process, and the conductor coil L of number-of-turns N is formed as a part of oscillator circuit. Then, the solid form component in which the conductor coil L was formed is taken out from vacuum devices into atmospheric air, the closure members 217, such as resin and a plug, close the upside opening 213, and the cavernous section 214 inside a spherical surface object is changed into a sealing condition.

[0081] Thus, if it manufactures, since the configuration section for the security function made to a solid form semiconductor device can arrange in a component, it becomes impossible to analyze from the outside and security nature improves.

[0082] Furthermore, if the configuration section for a security system is form with the oxidation ingredient ( for example, magnesium) which reacts with oxygen and generates heat and inert gas is enclose with the cavernous section 214, oxidation disappearance of the configuration section can be carry out at the moment of having decode recognition data and open the interior of a component wide, and data acquisition can be make impossible.

[0083] In addition, the configuration sections other than the coil L formed in spherical silicon can use N-MOS circuit. The typical sectional view cut so that it might travel through N-MOS circuit component is shown in drawing 1313 .

[0084] According to drawing 13 , by the impurity installation and diffusion of an ion plantation etc. using a general Mos process, P-Mos450 is constituted by the N type well field 402, and N-Mos451 is constituted by the Si substrate 401 of P conductor to the P type well field 403. P-Mos450 and N-Mos451 consist of the source fields 405 and drain field 406 grades which carried out impurity installation of the gate wiring 415 by poly-Si deposited on 4000A or more the thickness of 5000A or less with the CVD method through gate dielectric film 408 of 100A of thickness numbers, respectively and N type, or P type, and C-Mos logic is constituted by these P-Mos450 and N-Mos451.

[0085] The N-Mos transistor 301 for a component drive is too constituted from a drain field 411 on the P type well substrate 402, a source field 412, and gate wiring 413 grade by processes, such as impurity installation and diffusion.

[0086] Here, if the N-Mos transistor 301 is used as a component drive driver, the distance L between the drain gates which constitute one transistor will be set to about 10 micrometers at the minimum value. Although one of the 10-micrometer items of the is the width of face of the source and the contact 417 of a drain and the amount of those width of face is 2x2 micrometers, since the one half serves as combination with the next transistor, it is 2 micrometers of 1/the 2 in practice. Everything but the items is 4 micrometers for the width of face of 2x2 micrometers [ for the distance of contact 417 and the gate 413 ] 4 micrometers, and the gate 413, and is set to a total of 10 micrometers.

[0087] Between each component, the oxide-film isolation region 453 is formed of with a 5000A or more thickness [ thickness 10000A or less ] field oxidation, and it is detached by the component. This field oxide acts as an accumulation layer 414 of an eye further.

[0088] After each component is formed, and an interlayer insulation film 416

accumulates on the thickness which is about 7000Å by PSG by the CVD method, the BPSG film, etc. and is made it by heat treatment in flattening processing etc., wiring is performed through the contact hole by the aluminum electrode 417 used as the 1st wiring layer. Then, the interlayer insulation films 418, such as SiO<sub>2</sub> film by the plasma-CVD method, were deposited on 10000Å or more the thickness of 15000Å or less, and the through hole was formed further.

[0089] And connection with the conductor coil of the oscillator circuit as the energy conversion section formed in the front face of a solid form semiconductor device, the voice input sensor as the recognition section or a fingerprint sensor, etc. is made through the above-mentioned through hole.

[0090]

[Effect of the Invention] an energy conversion means transform into power the external energy which be supplied by non-contact from the exterior according to the memory device and solid form semiconductor device of this invention, a component be start, since it become possible to hold the individual humanity news recognize in the recognition section, it be necessary to perform a component and electrical connection for an electric power supply, and the component which carried out record maintenance of the individual humanity news can be arrange freely.

[0091] For example, by forming so that the conductor coil of an oscillator circuit may be twisted around the outside surface of a solid form semiconductor device as an energy conversion means, a conductor coil is made to generate power by electromagnetic induction between external resonance circuits, and power can be supplied to a component by non-contact.

[0092] Furthermore, by having established a means to hold the data recognized as individual humanity news, into a solid form semiconductor device, it becomes difficult to acquire individual humanity news in the analysis from the outside, and the security nature of individual humanity news increases.

[0093] In addition, since it is possible to recognize individual humanity news in three dimension, compared with the case where the semiconductor device of a monotonous form is used, there are also few limits of the direction of information recognition.

[0094] Moreover, by preparing such a solid form semiconductor device in a record head cartlidge, or carrying this cartridge in a recording apparatus, while recognizing individual humanity news to a record head cartlidge simple substance or a recording apparatus, it can be equipped with the function to hold this recognition data by high security nature.

[0095] Moreover, according to the security system of this invention, the recognition data

of those whom the owner of a recording apparatus permits and by whom he was registered are enciphered using the key code A which is a part of key code K which the owner decided. Since storage maintenance of this encryption data is carried out at the solid form semiconductor device of a record head cartlidge as what can be decrypted only in key code B which is the remaining part of said key code and storage maintenance of the key code B is carried out into the recording device, Even if it analyzes only a component, a registrant's recognition code is unacquirable. Moreover, if the encryption data-hold section is formed into the component using the solid configuration of a component, compared with the case where it forms on a flat-surface base, the data analysis from the outside will become very difficult, and its security nature will improve.

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[Translation done.]



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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the outline perspective view showing the ink jet recording device by the gestalt of operation of this invention.

[Drawing 2] It is drawing having shown the configuration of the security system of the recording apparatus of drawing 1, and the data transfer at the time of registration.

[Drawing 3] It is drawing having shown the configuration of the security system of the recording apparatus of drawing 1, and the data transfer at the time of user discernment.

[Drawing 4] It is drawing showing the flow of operation at the time of the registration in the security system of the recording apparatus of drawing 1.

[Drawing 5] It is drawing showing the flow of operation at the time of the user discernment in the security system of the recording apparatus of drawing 1.

[Drawing 6] It is the outline sectional view showing the voice input sensor used for the recognition section of the security system shown in drawing 1 thru/or drawing 3.

[Drawing 7] It is the outline top view showing the voice input sensor used for the recognition section of the security system shown in drawing 1 thru/or drawing 3.

[Drawing 8] It is the outline sectional view showing the fingerprint sensor used for the recognition section of the security system shown in drawing 1 thru/or drawing 3.

[Drawing 9] It is the outline block diagram of the fingerprint sensor used for the recognition section of the security system shown in drawing 1 thru/or drawing 3.

[Drawing 10] It is the schematic diagram showing the configuration of a head cartlidge of which record can be made impossible as a result of the user discernment judging in the security system shown in drawing 1 thru/or drawing 3.

[Drawing 11] It is drawing for explaining the power generating principle of the energy conversion section of the solid form semiconductor device used for the security system shown in drawing 1 thru/or drawing 3.

[Drawing 12] It is process drawing for explaining an example of the manufacture approach of the solid form semiconductor device used for the security system shown in drawing 1 thru/or drawing 3.

[Drawing 13] It is the typical sectional view cut so that it might travel through N-MOS circuit used for the solid form semiconductor device used for the security system shown in drawing 1 thru/or drawing 3.

[Drawing 14] It is drawing showing other examples of application of the solid form semiconductor device of this invention.

[Description of Notations]

1 Ink Jet Recording Device

20 Image Sensors

21 Individual Humanity News Input Adapter

22 Control Board

23 CPU

30 Solid Form Semiconductor Device

31 External Resonance Circuit

32 Oscillator Circuit

101 Registrant's Voice Etc.

102 Recognition Section

103 Recognition Data-hold Section

104 Encryption Transducer

105 Key Code A Attaching Part

106 Encryption Data-hold Section

107 109 Information I/O section

108 110 Energy conversion section

111 Key Code K Setting Section

112 Key Code A Attaching Part

113 Key Code B Attaching Part

114 Encryption Data-hold Section

115 Recognition Data-hold Section

116 Data Comparator

117 Decryption Transducer

118 Decryption Data-hold Section

119 Judgment Processing Section

121 User's Voice Etc.

150 Body

151 Solid Form Semiconductor Device  
200 Silicon Strain Gauge  
201 Electrical Circuit Section (PNP Transistor)  
202 Diaphragm  
203 Fingerprint Sensor  
205 Resistive Layer  
206 Finger  
211 Spherical Silicon  
212 SiO<sub>2</sub> Film  
213 Opening  
214 Cavernous Section  
215 SiN Film  
216 Cu Film  
217 Closure Member  
301 Ink Tank  
302 Ink  
303 Bulb  
304 Suction Pump  
305 Ink Jet Recording Head

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[Translation done.]